Peter M. Woiceshyn

Member of The Technical Staff (more than 31 years)

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EDUCATION:

B.S. in APPLIED PHYSICS, summa cum laude, West Coast University, L.A., 1969

M.S. in PLANETARY and SPACE PHYSICS, U.C.L.A., 1971.

Graduate studies at U.C.L.A. were continued another four years in the Department of Atmospheric Sciences -- a total of 122 graduate units were completed with a G.P.A. of 3.3 before taking a leave of absence in 1975. Both degrees were earned while employed full time at TRW Systems and under the Part Time Academic Program at JPL.

Other academic studies were in engineering at Queen's University, at McMaster University, and at the University of Toronto between the years 1951 - 1954, all in Canada.

Numerous engineering and physics courses, technical management courses were taken at the AVRO Aircraft Engineering School (Toronto, Canada), at Lockheed Aircraft Corp. (Burbank, CA), at TRW Ltd. (Redondo Beach, CA), and at JPL.

Scholastic Honors:

Sigma Pi Sigma (Physics); Pi Mu Epsilon (Mathematics); and Tau Beta Pi (Engineering)

EXPERIENCE:

Joined JPL in 1970 . Since May 1996, I have been supporting Dr. David Halpern in his air-sea interaction and tropical research studies with remote sensing and buoy data.

Generally speaking, my JPLexperiences since 1977 to 1996 can be ascribed as conducting research in the fields of satellite meteorology and oceanography, air-sea interaction, scatterometry and altimetry. This included calibration and validation of the satellite data as well as the development of algorithms and transfer functions. In support of this work, scientific visualization techniques and programming tools were developed for a more effective dissemination of remote sensing research results.

My initial JPL position in 1970 was that of Technical Manager of the Mars Atmospheric Water Detector instrument on the Viking spacecraft. From 1971 to 1977, I conducted research as a planetary atmospheric scientist.

Prior to JPL, my experience was basically that of a design- and systems-engineering specialist in aircraft design and in manned and autonomous spacecraft design. In addition, I was an instructor in modern physics and statistical thermodynamics at West Coast University, Los Angeles, and in systems design engineering at AVRO Aircraft in Toronto, Canada.

Principal Investigator Significant Experiences Up To 1996:

For more than 20 years, I had continuously participated in scatterometer research, analysis, and applications, e.g.:

(1) I implemented and wrote 'real-time' procedures for processing and validation of ERS-1 sactterometer winds at NOAA-NWS-NMC's Marine Prediction Branch (as a Visiting Scientist (1993 & 1994)). The software is being currently used to process ERS-1 & ERS-2 scatterometer data for the purpose of assimilating the scatterometer wind data into operational meteorological and oceanographic numerical prediction models, and into climate numerical models. The JPL/NOAA ERS-1 scatterometer software that I implemented is also in use at the NAVY, and NASA-GSFC for both operational and research applications. I furthered the concept that operational centers are cost effective in time, analysis, and utility for conducting scatterometer calibration/validation and backscatter-to-wind transfer function development. This concept was perceived by ESA to be invaluable.

(2) As a Visiting Scientist (1991 &1992) at ECMWF in England, I participated in the calibrationd/validation of ERS-1 data and algorithms, and in the development of ERS-1 scatterometer transfer-function-model -- by utilizing real-time availability of the ERS1 data, and the corresponding ECMWF operational wind and wave models and data.

I was selected as co-investigator on two successful proposals to ESA/NASA pertaining to ERS-1 Scatterometer research, one with ECMWF (Dr. A. Hollingsworth, Principal Investigator) and the other with CNR-Venice (Dr. S. Zecchetto, Principal Investigator). In February of 1990, I participated in an ERS-1 campaign in Norway that tested both airborne and surface calibration/validation instruments and system.

(3) In 1996, I formulated a scatterometer wind retrieval algorithm (SASS3) to correct major directional discrepancies in the SASS2 scatterometer transfer function. -- The SASS2 retrieval algorithm, the pre-flight candidate used for NASA's NSCAT scatterometer, did not use any meteorological data or analysis comparisons for its formulation (a major accomplishment by F. Wentz). However, my research showed that the SASS2 (and in greater measure SASS1), when evaluated with actual meteorological analysis fields from ECMWF, had large systematic directional errors. These were associated with an over-estimate (by the SASS2 transfer function) of the upwind/crosswind ratio of the actual SEASAT measurements. The paper describing this work for 'refereed-literature' submission is in progress..

Other Significant Experiences & Roles:

My other roles in scatterometry and meteorological/oceanographic research have included: SEASAT scatterometer experiment team member and deputy evaluation task group leader; SEASAT geophysical algorithm and scientific coordinator; co-investigator to Canada's research study on the application of scatterometer winds to regional marine forecasts; and co-principal investigator with U.C.L.A. and AES-CANADA to NASA-GSFC's study on the applications of scatterometer winds to global weather forecasting. I was also responsible for and performed meteorological analysis of the "surface-truth" wind fields for the GOASEX Workshops.

My previous scientific research at JPL (1970-1977) resulted in refereed publications that included: comparative studies of global dust storms on Earth with Mars; and atmospheric studies on Mars and Jupiter using radio-occultation data.

For the 14 years prior to joining JPL, I was an aircraft and spacecraft senior design engineer working on various projects that included Canada's AVRO Arrow, Lockheed's SST, NASA's Pioneers 10 and 11, and NASA's Project GEMINI manned space program (here as both the liaison and escape systems engineer). At AVRO Aircraft, I also served one year as an Instructor in the AVRO Aeronautical Engineering School specializing in structural, electrical, and hydraulic design. At TRW (1967-1970), I designed the thermal control systems for Pioneers 10 and 11, as well as participated in the design of structural components of other spacecraft. While at TRW, I was also involved in the development of computer aided design applications. My responsibilities included group leadership for various design assignments. During this time period , I also taught statistical thermodynamics and modern physics at West Coast University, Los Angeles.

Professional Awards:

Received two cost reduction awards from TRW Systems, Redondo Beach, CA

Received two NASA Group Achievement Awards while at JPL

Received two NASA monetary awards for new technology reports while at JPL

Professional Societies, and Committees:

1995 - Selected as adjunct member of the NSCAT algorithm development/evaluation/calibration team.

1990 - Selected as a Member of the ERS-1 AMI Cal/Val Analysis Team. I was one of two US members on this team.

1986 - Elected a Fellow of the Royal Meteorological Society.

1985 - Appointed by JPL to be a member of the NSCAT (scatterometer) Project Review Board.

1984 - Selected as a member on the European Association of Remote Sensing Laboratories (EARSeL), Working Group 11, devoted to research and applications with microwave remote sensing instruments in semi-enclosed seas such as the Mediterranean.

1981 - Appointed by NASA to the Satellite Surface Stress (S-Cube) Committee chaired by Professor J. J. O'Brien.

1980 - Selected as a member of the NOSS scatterometer instrument working group.

1979 - Appointed by the SEASAT Project to be the SEASAT GOASEX II Workshop organizer and vice-chairman. The workshop was held to validate/calibrate SEASAT's 5 instruments.

Selected List of Invited Presentations

1988 - An invited speaker at the SEASAT 10th Anniversary Meeting, June 28-29, at the Linnean Society, Piccadilly, London, England.

1987 - An invited speaker at one of the IGARSS'87 sessions (ocean scattering) held in Ann Arbor, MI.

1984 - An invited speaker at both Technion in Haifa, Israel, and at the URSI Commission F Symposium and Workshop on the Frontiers of Remote Sensing of the Oceans and Troposphere from Air and Space Platforms held in Shoresh, Israel.

1977 - An invited speaker at the International Conference on Desertification in Semi-Arid Lands held in Tel Aviv, Israel. That conference was jointly sponsored by both the Israeli and American Meteorological Societies.

Contributions to Science and Remote Sensing Education

In Aug/Sept 1995, I developed the image for JPL NSCAT Project's "Outreach Program" poster.

My SEASAT scatterometer wind field video images (with credits) were used in the UK Channel 4 series "*Spaceship Earth*" shown in the program titled "*The Swirling Seas*" on March 21, 1991. The TV series was produced by Network TV/Antelope Films in the United Kingdom. It will be shown at a later date on PBS in the US. The TV series consists of ten programs and was sponsored by the National Science Foundation and Shell.

My SEASAT scatterometer wind field images were requested by the DISCOVERY channel and were sent in June 1992 for use in their educational broadcasts on remote sensing and the environment.

My SEASAT scatterometer image was used for the NOVA 1988 calendar, published by WGBH-Boston and the Yankee Publishing, Inc., ISBN: 0-89909-144-X, 895X-88.

Two of my SEASAT scatterometer images (pages 49 and 52) were used for "Science Facts - Weather", by Peter Lafferty, published by Crescent Books, distributed by Outlet Book Co., Inc., a Random House Company, 40 Engelhard Ave., Avenel, New Jersey 07001 (also available from Colour Library Books, Ltd., Godalming, Surrey, England), pp108, 1992.

My SEASAT scatterometer image (pages 42 and 43) was used for "Embracing Earth - New views of our changing planet", by Payson R. Stevens and Kevin W. Kelly, published by Chronicle Books, 275 Fifth Street, San Francisco CA 94103, pp176, 1992.

A two page SEASAT image was used in the chapter "Painting Nature by the Numbers," in the book "Understanding Computers: The Puzzle Master," published by *Time-Life Books*, Alexandria VA, 6-7, 1988. The purpose of this volume was the demonstration of the use of computers in the solution of scientific problems.

Also:

SEASAT image on COVER of March 13th Issue of *Aviation Week & Space Technology*, 1989, the feature story of which was "Mission to Planet Earth."

SEASAT image on COVER of *GEOGRAPHICAL* Magazine supplement, "Spaceship Earth", *GEOGRAPHICAL* - The Monthly Magazine of the Royal Geographical Society, Volume LXIV, No. 3, March 1991.

SEASAT image on COVER of *NASA Tech Briefs*, Volume 14, Number 10, October 1990.

SEASAT image on COVER of 'Applications of Satellite Remote Sensing Over The Indian

Ocean', a manual produced by the Organisation for Indian Ocean Marine Affairs Co-operation (IOMAC) sponsored by the United Nations Development Programme and the Un Outer Space Affairs Division (Dr. Hiran W. Jayewardene, Secretary-General, IOMAC, Colombo, Sri Lanka), 1991

SEASAT images and text were included in "ERS-1, A new tool for global environmental monitoring in the 1990's," published by the European Space Agency, *ESA BR-36*, 8-10 Rue Mario-Nikis, 75738 Paris Cedex 15, France, November 1989.

SEASAT images and text were included in "Observing Earth From Space: The Greenhouse Effect," *Engineering & Science*, Volume LII, Number 2, Published by the California Institute of Technology and the Alumni Association, 1201 East California Blvd., Pasadena, CA 91125, Winter 1989.

SEASAT images and text were included in "ERS-1: A Contribution to Global Environmental Monitoring in the 1990's," *by* Bruzzi, S., and M. Wooding, *ESA bulletin*, 82, 11-21, May 1990.

SEASAT scatterometer image was included in the 1991 SGI Calendar, "Visualizing Our Changing Planet," published by Silicon Graphics, Inc., 2011 N. Shoreline Boulevard, M/S 8U-580, Mountain View, CA 94039-7311.

PUBLICATIONS (1973 - Present):

Halpern, D.; Woiceshyn, P; Zlotnicki, V., et al. An atlas of monthly mean distributions of SSMI surface wind speed, AVHRR sea surface temperature, TMI sea surface temperature, AMI surface wind velocity, SeaWiFS chlorophyll-a, and TOPEX/POSEIDON sea surface topography during 1999. Pasadena, CA, National Aeronautics and Space Administration (NASA), Jet Propulsion Laboratory, 2001. v, 102p. JPL Publication 01-01. NAS 1.12/7:01-01.

Halpern, D.; Liu, W.T.,Woiceshyn, P; Zlotnicki, V., et al. An atlas of monthly mean distributions of SSMI surface wind speed, AVHRR sea surface temperature, AMI surface wind velocity, NSCAT Surface Wind Velocity, and TOPEX/POSEIDON sea surface topography during 1998. Pasadena, CA, National Aeronautics and Space Administration (NASA), Jet Propulsion Laboratory, 2000. v, 102p. JPL Publication 00-08. NAS 1.12/7:00-08

Halpern, D.; Woiceshyn, P; Zlotnicki, V., et al. An atlas of monthly mean distributions of SSMI surface wind speed, AVHRR sea surface temperature, TMI sea surface temperature, AMI surface wind velocity, SeaWiFS chlorophyll-a, and TOPEX/POSEIDON sea surface topography during 1997. Pasadena, CA, National Aeronautics and Space Administration (NASA), Jet Propulsion Laboratory, 1999 v, 82p. JPL Publication 99-12. NAS 1.12/7:99-12

Halpern, D. and P.M. Woiceshyn (1999) Onset of the Somali Jet in the Arabian Sea During June 1997. Journal of Geophysical Research, 104, 18041-18046, 1999.

Halpern, D.; Woiceshyn, P; Zlotnicki, V., et al. An atlas of monthly mean distributions of SSMI surface wind speed, AVHRR sea surface temperature, AMI surface wind velocity, , and TOPEX/POSEIDON sea surface topography during 1996. Pasadena, CA, National Aeronautics and Space Administration (NASA), Jet Propulsion Laboratory, 1998 v, 73p. JPL Publica-

tion 98-11. NAS 1.12/7:98-11

C. S. Hsu,Wurtele, M. G., G. F. Cunningham and P. M. Woiceshyn, , "Surface Pressure Fields from Scatterometer Winds Alone," submitted to J. Applied Meteor., in press, 1997.

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Halpern, D.; Woiceshyn, P; Zlotnicki, V., et al. An atlas of monthly mean distributions of SSMI surface wind speed, AVHRR sea surface temperature, AMI surface wind velocity, , and TOPEX/POSEIDON sea surface topography during 1995. Pasadena, CA, National Aeronautics and Space Administration (NASA), Jet Propulsion Laboratory, 1998 v, 73p. JPL Publication 98-5. NAS 1.12/7:98-5

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Woiceshyn, P., Tsann Wang Yu, and William Gemmill, Use of scatterometer data to derive ocean surface winds at NMC, Conference Proceedings, 13th Conf. on Weather Analysis and Forecasting Including Symposium on Flash Floods, Aug. 1 - 6, 1993.

Woiceshyn, P., and P. Janssen, Sensitivity study - scatterometer retrievals with wave age parameter, ESA WPP-36 Workshop Proceedings, available from ESA, 8-10 rue Mario Nikis, F-75738, Paris, France, pp. 133 -139, 1992

Janssen, P., and P. Woiceshyn, Wave age and the scatterometer wind retrieval algorithm, ESA WPP-36 Workshop Proceedings, available from ESA, 8-10 rue Mario Nikis, F-75738, Paris, France, pp. 141 -145, 1992

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Anderson, D., A. Hollingsworth, S. Uppala, and P. Woiceshyn, "A Study of the Use of Scatterometer Data in the European Centre for Medium-Range Weather Forecasts Operational Analysis-Forecast Model, 1. Quality Assurance and Validation," *J. Geophys. Res.*, 96, 2619-2634, 1991.

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Peteherych, S., W. S. Appleby, P. M. Woiceshyn, J. C. Spagnol, and L. Chu, "Applications of SEASAT Scatterometer Wind Measurements for Operational Short Range Weather Forecasting," *Weather and Forecasting*, 3, 89-103, 1988.

Woiceshyn, P. M., G. F. Cunningham, M. G. Wurtele, "Wave Hindcasts with OCTI DWAVE model forced by scatterometer and other wind fields," *JPL Int. Doc. D-5702*, Jet Propulsion Laboratory, Pasadena, CA 91109, 18pp, August 15, 1988.

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Atlas, R., W. E. Baker, E. Kalnay, M. Halem, P. Woiceshyn, and S. Peteherych, "The impact of scatterometer wind data on global weather forecasting," Proceedings of the URSI Commission F Symposium and Workshop, Shoresh, Israel, May 14-23, 1984, *NASA Conf. Publ. CP-2303*, 567-573, 1984.

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ABSTRACTS:

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